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Nano Robot App Simulation to Aid Deep Learning Education

***Murad Shahadha Mahmood*[1]**
***Sajidah Shahadha Mahmood*[2].**
sajidah.sh.mahmood@aliraqia.edu.iq

Abstract

It has become at the present time (the time of preparing the research paper) and in the sciences related to the fields of nanotechnology and its sciences, which have become the most widely used and common in modern technology. , and every day. Nanotechnology and technology has become a multi-disciplinary technology, as it enters into the minute details of individual atoms and nanoparticles, and the transformation has begun in the design of materials with extreme accuracy and the creation of materials based on nanotechnology, nanomachines, and modern software for applications in the most aspects of our daily lives. The development of nanotechnology and keeping pace with its modernization has become one of the necessities of scientific research for the academic and university community, as well as in training new generations to qualify them to keep pace with future developments of science students.

The progress made in the areas of nanotechnology and academic and educational education using nanotechnology has been studied, and recent applications (at the time of preparing the research paper) for the sciences related to the field of nanotechnology have been reviewed, and the latest research and studies that preceded the preparation of the research paper have been studied and reviewed in an extensive manner. To present a strategy for academic and educational education that uses nanotechnology.

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INTRODUCTION

In view of what researchers and academics have reached for this technology and its importance in many fields, international countries have paid a lot of attention to this technology, especially the developed world, and the developed world has been keen to introduce this nanotechnology in teaching, training and education. Programs and departments for scientific research, universities and institutes for scientific research and scientific

laboratories for this modern technology have been built in developed countries. Modern nanotechnology and technology provide the academic community with good job opportunities. This is due to the general tendency of the developed countries to employ those interested in this modern technology and to benefit from those interested in this modern technology in software applications to update their products and rely on them in their future curricula.. Europe is considered one of the first countries to reformulate curricula to include this field in order to prepare learners and guide them in the future. Countries have also paid great attention to teaching and teaching nanotechnology in schools and universities, and training teachers on how to teach different sciences using nano applications because of its importance in linking teachers to scientific development. Teaching with nanotechnology is considered an urgent necessity in the 21st century, in light of the technical and scientific acceleration and the great competition between countries in education. Numerous conferences and symposiums have indicated the necessity of introducing nanotechnology into the school curricula so that the student does not feel the gap between the school and the reality in which he lives and sees.

The situation for education using nanotechnology

When a lot of research and studies were studied to develop educational curricula and multiple sciences in many diverse disciplines, which allowed university students, academics and teachers to succeed in their educational work and master it at good levels [7, 10].To keep pace with academic, scientific and industrial developments of all kinds When nanotechnology is introduced into the educational curricula and programs for the training course for educators. It becomes difficult to achieve those

Educational goals without being elaborate, easy and fixed. The development that took place with nanotechnology is a wide field of research for academic researchers in education and training for science students and their graduation with high efficiency. Where graduates have sufficient ability to teach using modern technology and skilled applications of nanotechnology systems.

1.2 Problem data

To increase the quality and efficiency in the educational and educational process and to develop the educational level to keep pace with the recent and rapid developments of technological sciences in the developed world and to open the way for researchers to find innovative ideas for teaching, education and training by finding software means and applications that use advanced technology such as nanotechnology, which at the present time has become the technology of the future because it It develops rapidly and contributes to the development of science and the educational and educational process

1.3 Research Questions

1. Is there a great need to combine colleges in schools on the one hand and on the other hand to combine academic levels and institutions , Where this combination will provide effective communication for the exchange of experiences and the development of the most appropriate educational activities in education and will also provide work experiences for the community and a high degree of performance?
2. Is it possible to take advantage of the means of communication that are appropriate for children and suitable for youth orientations: such as game applications, which were not properly used by teachers in science as an illustrative and auxiliary means that raises interest in the curricula?.
3. Is it possible for nanotechnology to be appropriate to communicate with teachers and academics at all levels to reach the required level of education and develop curricula through their use of nanotechnology. And benefit from nanotechnology for everyone - including members of the educational and educational community and researchers in graduate academic studies - to benefit from this technology, enjoy and learn from it In order for nanotechnology to contribute to preparing teachers to achieve quality education in curricula, to train teachers and science teachers in particular, and to train teachers on how to teach nanosciences and nano research and benefit from them in education? [6]

1.4 Research objectives

To contribute to nanotechnology in building modern societies and to more manpower and trained in nano research, Preparing programs for the development of education using nanotechnology. To catch up with nanotechnology, to develop the educational process In the educational process for all stages and levels, from special education for children to postgraduate research students in masters and doctoral studies. This includes finding alternatives in some vocabulary for the curricula, as well as the method that the teacher follows in teaching basic science subjects such as physics with all its branches, chemistry as well, biology and mathematics as well. This includes developing nanotechnology applications in developing and assisting the teacher in the current science curricula, and evaluating and updating curricula based on nanotechnology.Developing software for college students to strengthen the information and software skills of student teachers with nanotechnology applications, spreading culture of the importance of the technological role, and supporting software for nano applications. In the general curricula of colleges of education.

Robots can be divided into robots manufactured by international factories such as - KUKA - ABB - and Festo. And it has ways of using and programming specific to each company. But these robots are very expensive and difficult to work on and buy. On the other hand, there is the field of developing open source robots, in which any electronic controller, any motor and any parts can be used, whether you make them by 3D printing, welding, CNC machine, carpentry, etc…

The most important robot companies around the world for the purpose of this research paper are about ten companies and almost the best companies for the manufacture of robots of various types from human-like robots to aircraft robots.

-ABB
-Kuka
-Festo
-Yaskawa Europe

Each company is unique in the way it manufactures and operates, and the control interfaces differ from one company to another

1- CODING

Programming skill is one of the most important skills and must be mastered, and attention must be paid to logical thinking (algorithms - mathematics - and engineering mathematical operations)

It is one of the most important programming languages used in robot programming

-C
-Python
-C .++
-Java

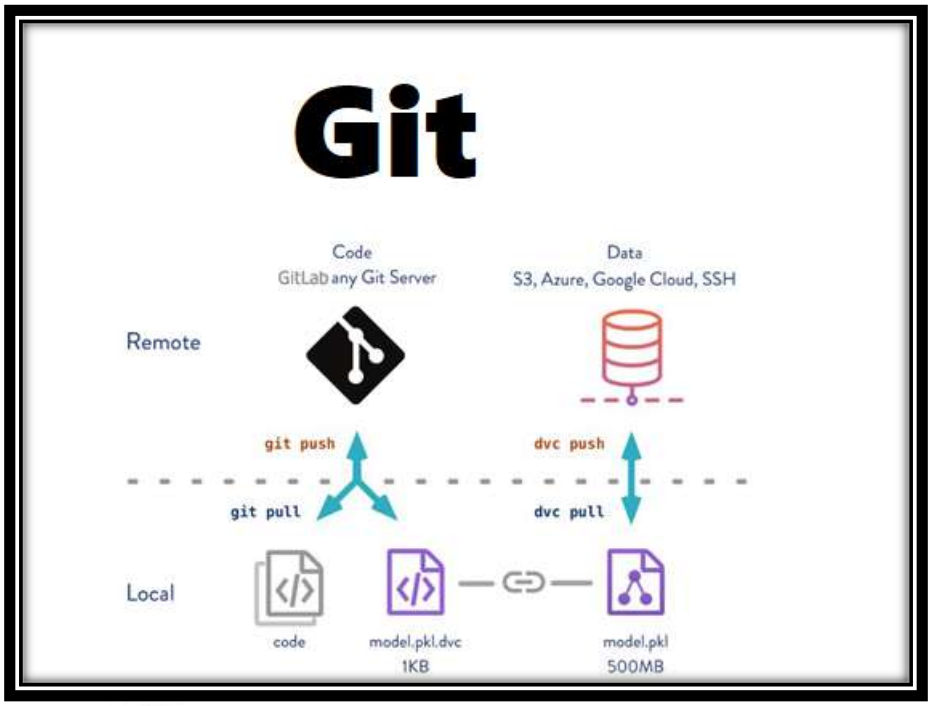
It is also necessary to know OOP, such as creating a Class and Object Object and building functions and functions.

If the robot is for tracing, for example, if /else . is used

2-GIT

It is the control tool through the code and this code can be shared to a team that acts as a code repository and store

In Figure (1), an explanation of how Git . works



3- Electronic controllers

Electronic controllers are considered the brain for the robot, especially if dealing with open source robots. The most important of these controllers are:

C++ or Python Any programming language It uses Python It uses c++

4 -Operating Systems

One of the important tools is to use an operating system suitable for the programming process, and one of the best operating systems to use is Ubuntu, which is preferred for Android developers as it is an open source system unlike Windows. Therefore, the learning resources are more

6- SIMULATION

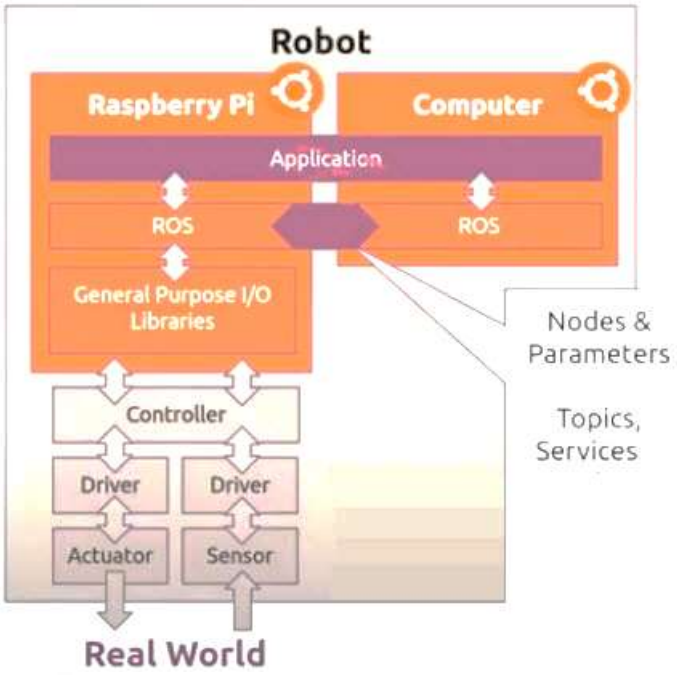
There are many simulation programs that help to simulate the movement or work of the robot, as it saves a lot of effort and time in avoiding errors in manufacturing or programming, and the most famous of these programs are:

Web
Gazebo
RoboDK

But the most famous of them - compatible with Windows is Webot, and the truth is the program is impressive in terms of the many graphics and models stored in it, its method of simulating the movement of objects virtually, and the possibility of programming each robot

7- Android OS . ROS

It is an open source meta operating system for robots. It provides the services we expect from an operating system, including controlling the device, executing commonly used functions, passing messages between processes, and managing packets. It also provides tools and libraries for obtaining, creating, writing and running code across multiple computers. It can be called a framework in robotics



1.5 Scope of Search: -

Performance in education was tested in Baghdad schools, Al-Rusafa District, "Kuwait Child Friendly School" and in the College of Education / Iraqi University - Baghdad through the use of nanotechnology applications in education.

1.6 motivation to research

Nanotechnology will reflect positively on the size and efficiency of local and international educational cadres, and previous and other applications of nanotechnology in the field of education will make it necessary to develop the awareness of students and teachers in the field of science, and here the importance of universities playing a leading role in research programs for students in the field of nanotechnology in programs Various academic programs in general and in teacher preparation programs that use technology and educational technology in particular.

Through the great importance of nanotechnology, a robot was programmed and the software applied in a question-and-answer manner...

It was programmed in Python, according to the following steps:

a- Programmed in Python. very important note (the following libraries must be downloaded to the computer for programming for the robot)
-pip install playsound
-pip install pyaudio
-pip install pipwin
-pipwin install pyaudio
-pip install SpeechRecognition
-pip install gtts

Figure 1 shows how to load the data for the library that helps the robot run

```
Microsoft Windows [Version 6.1.7601]

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C:\Users\computer 1>pip install playsound

Requirement already şatisfied: playsound in c:\users\ computer 1 amseythonpython37 1ibite-packages
(1.2.2) WARNING:

You are using pip version 20.0.2; however, version You should consider upgrading via the 'ç:\users\
computer 1\app ython\python37\python.exe 4 pip install -upgrade pip' cm

C:Users\ computer 1> pip install SpeechRecognition

Requirement aready sat isfied:   SpeechRecognition in c:\user

Al\plerograms\python\python37\lib\site-packages (3.8.1)

WARNING: You are using pip version 20.0 .2; however, version

You should consider upgrading via the ç:\users\ computer 1 \app ython\ python37\python. exe -m pip
install --upgrade pip com

C:Users\ computer 1> pip install pyaudio

Requirement already satisfied: pyaudio in c:\users\y python python371ib\s ite-packages (0.2 .11)

WARNING: You are using pi version 20.0.2; however You should consider upgrading via the 'ç:\users \yass
ython\python37\python.exe -m pip install --upgrade pip

. C:NUsers \ computer 1>
```

We need a picture of a robot for the simulation purpose as well as to be in the simulation program interface.

Figure 2 of a robot photo

Figure 2-b of a robot photo

b-Program code

```
1 from tkinter import *
2 from tkinter import ttk
3 import playsound
4 import speech_recognition as sr
5 from gtts import gTTS
6
7
8 def listen_user():
9       ""capture audio""
10
11 rec sr. Recognizer()
12
13 with sr.Microphone() as source:
14 print('Mr ROBOT IS LISTENING...')
15 audio - rec.listen(source, phrase_time_limit-5)
16
17 try:
18text - rec.recognize_google(audio , Language- 'en-US')
19  return text
20
21 except:
22          print("Sorry, I had a problem")
23           return 0
24
25 def talk(text,file):
26        Tts=gtts(text=text,lang="en"
27        Filename ="%s.mp3"%file
28         Tts.save(filename)
29          Playsound.playsound(filename)
30
31
32   def conatct():
33           text_returnd = listen_user()
34          if text_returnd== "hello":
35 Talk("Hello welcome to Mr Robot what is your name","b")
36 khalid=listen_user()
37 Name=Khalid.split()[-1]
38 Talk(Your name is %s"%name,"c")
39  root = Tk()
40 root.title("Mr Robot")
41 root.geometry("520x600")
42 root.resizable(False, False)
43
44   rbt=photoimage(file=ropot.png)
```

```
45 Label(root,image=rbt).place(x=0,y=0)
46
47 ttk.Button(root,text="Start", command=lambda:contact grid (column=0,row = 0, padx = 10, ()." ,)
```

c-Explanation of the program and how it works:

After writing the programming for the robot using the simulation method, we run the program and Figure (2,2-b) will appear . The word “Start” is pressed, then talk to the robot and the question, according to what was written in the program, is “Welcome,” and then the robot will answer, “Welcome to the robot application. What is your name?”

For example, we will answer “Kalid”, and the robot will reply your name “Kalid”, and the name will be printed and saved to a file called “b” in the . It is possible to write any question in the program, and through this robot, it is possible to interact with students at any educational stage and have a dialogue with them

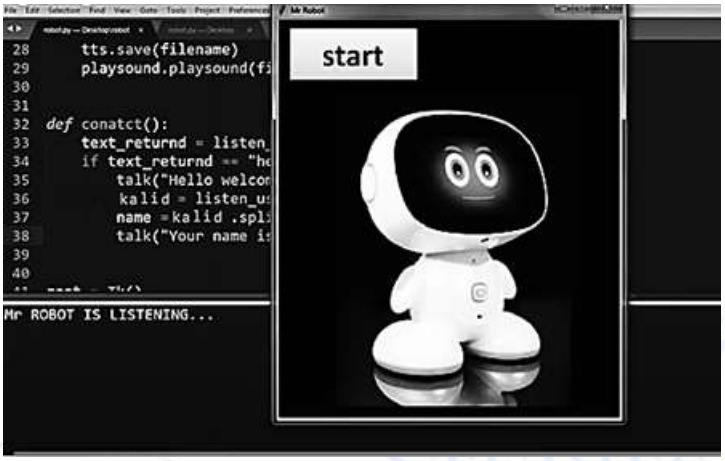

Fig3

In Figure 3, the figure shows the robot listening to the speaker's voice in order to answer the question that was directed by the robot to the speaker

1.7 Contributions

Nanotechnology and research in this field have become One of the most popular every dayThe newly formed nanotechnology has become a great and striking interest for the new millennium. Where its applications have become highly influential because of its great and enormous potential for the world. Where nanotechnology has affected all areas of life such as the materials used in our daily lives, electronics, mobile devices and data, as well as bio-biological sciences and in the systems of the army, energy, environment, medicine and economy, where it had a great impact on nanotechnology. In Japan, Europe and other developed countries, there are many research and development in this field, as well as many innovative research ideas in the public and private sectors, and efforts are made in research and development of nanotechnology. [1]

Hundreds of millions of dollars have been allocated. Research and development is likely to be in the field of nanotechnology Changing traditional practices of design, analysis and Manufacturing of a wide range of engineering products.

This effect creates a challenge for the academic Society to educate students with the necessary knowledge, understanding and skills Interact and provide leadership in the emerging world Nano technology. [2]

1.7 Nano applications:

-The teacher or university professor practicing the teaching profession must have knowledge of nanotechnology and have scientific experience in it [11-15] All the time "in and out of class". And to be

following the recent developments in nanotechnology and the activities practiced by all educational institutions that support creative ideas and that give nanotechnology the highest priority in their educational work.

-The use of nanotechnology is broad and comprehensive in the applications and systems used in education and scientific courses and for all disciplines. Nanotechnology can be used with interactive learning. Where it can play an active role in the ease of learning "inside and outside the classroom". Students can participate very effectively as nanosystems are very fun to use. This enhances the quality of education levels conclusion Many schools in the world have A review of their curricula to be appropriate and keep pace with the technological development in the world through the use of mobile devices and mobile phones. Many researchers and countries are trying to introduce nanotechnology into university curricula and schools. This paper will help many researchers

-The use of nanotechnology in publishing interactive books for researchers and students

-The use of nanotechnology in communication programs between students and teachers

-The use of nanotechnology in software and applications that facilitate the educational process, such as interactive learning platforms and electronic exams in schools and universities.

-The use of nanotechnology in scientific research for graduate students

-Using nanotechnology in scientific laboratories and conducting experiments for educational curricula and courses without posing a danger to users or being financially costly

- Nano applications in the field "nano food." Food companies seek to apply modern technologies such as nanotechnology in order to produce better agricultural crops,

The use of nanotechnology will help food companies to produce foodstuffs free of preservative damage, by using less chemicals in food production in the future. There are some products produced through nanotechnology, such as some types of juice, and it is expected that nanotechnology will contribute to achieving progress in agriculture and food.As well as providing pure water, [3]

- Nanotechnology and its applications in medical faculties. The recent developments of nanotechnology applications in educating medical students have helped him, and given the technological development we are living in in the field of nanotechnology for modern medicine, this technology is different, such as teaching students through interactive programs on ways to deliver medicine to the body Human and its effectiveness in eliminating various cells in the human body to treat the patient.

Through these applications of nanotechnology, it is possible to easily photograph the smallest details of the human body and explain them to medical students, and these cells can also be controlled and reshaped in different ways through interactive nanotechnology techniques and applications.

- Applications of nanotechnology in the human environment in the community of students, universities and schools As a result of progress and development in nanotechnology applications, the United Nations has taken care of this technology and developed a strategy for the purpose of benefiting from these applications in all its fields and scientific disciplines. Nanotechnology increases the possibility of efficiency and quality of energy consumption by reducing consumption in scientific institutions, to preserve the environment, and to find solutions to many obstacles. Also, nanotechnology has a great potential for lab work at very low costs. In the future, it is expected that this technology will be used in the faculties of medicine, industry, energy, agriculture, technology, nutrition, health environment and astronomy, in addition to the military and defense fields. [5,4]

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